"On the Structure of the Palæozoic Seed, *Lagenostoma Lomaxi*, with a Statement of the Evidence upon which it is referred to *Lyginodendron*." By Professor F. W. Oliver and Dr. D. H. Scott, F.R.S. Received December 15, 1903,—Read January 21, 1904.

(Abstract.)

The present communication deals with the structure of *Lagenostoma Lomaxi*, a fossil seed from the lower coal-measures, and with the evidence upon which the authors refer it to the well-known carboniferous plant, *Lyginodendron*.

It is found that this species of *Lagenostoma*, especially in its young form, was inclosed in a husk or cupule, borne on a short pedicel.

The seed, which is of Cycadean character, is fully described, and its relation to other fossil and recent seeds discussed.

The cupule inclosing the seed was borne terminally on a pedicel; it formed a continuous, ribbed cup below, and divided above into a number of lobes or segments. Externally, both pedicel and cupule were studded with numerous prominent multicellular glands of capitate form. The anatomy indicates that the whole organ was of a foliar nature.

A comparison with the vegetative organs of *Lyginodendron Oldhamium*, with which the seeds are intimately associated, demonstrates a complete agreement in the structure of the glands and in the anatomy of the vascular system. Where vegetative and reproductive organs, presenting identical structural features, not known to occur in other plants, are thus found in close and constant association, the inference that the one belonged to the other appears irresistible.

As regards the position of the seed on the plant, two possibilities are discussed: the cupule, with its pedicel, may either represent an entire sporophyll, or a modified pinnule of a compound leaf. Either view is tenable, but various comparative considerations lend a somewhat greater probability to the second alternative.

In the concluding section of the paper, the systematic position of *Lyginodendron* is discussed. On the whole of the evidence, the position of the genus as a member of a group of plants transitional between Filicales and Gymnosperms appears to be definitely established. While many Filicinean characters are retained, the plant, in the organisation of its seed, had fully attained the level of a Palæozoic Gymnosperm. There are many indications that other genera, now grouped under Cycadofilices, had likewise become seed-bearing plants. It is proposed to found a distinct class, under the name *Pteridospermæ*, to embrace those Palæozoic plants with the habit and

much of the internal organisation of Ferns, which were reproduced by means of seeds. At present, the families Lyginodendreæ and Medulloseæ may be placed, with little risk of error, in the new class, Pteridospermæ.

"Some Experiments in Magnetism." By T. C. PORTER. Communicated by LORD RAYLEIGH, O.M., F.R.S. Received November 9,—Read November 26, 1903.

[PLATE 1.]

For many years the writer has, from time to time, been engaged in studying the effect of a powerful magnetic field upon crystals in the act of their formation and growth. It seemed to him probable that if the molecules of substances have magnetic poles, they might group themselves differently when under the influence of a powerful magnetic field, thus producing an orientation of the crystals, or even an alteration in the form or optical characteristics of the crystals themselves. It seemed also possible that if the supposed polar properties of the molecules were the result of atomic polarity, a powerful external magnet might produce some appreciable effect in the chemical combination of the atoms, changing the rate of chemical reaction, if it did not change the character of the compounds formed. Many effects were observed, and were at first erroneously attributed to the influence of magnetism; later, when, by specially contrived apparatus, the influence of variation in temperature, humidity of the air, and above all of the history and character of the surfaces upon which the crystallisation took place, were investigated, these effects were one after another traced to causes other than magnetic, so that the results must, on the whole, be taken as negative. Cases of orientation of crystals growing in the magnetic field and watched under the microscope from their first visibility till they had attained considerable size, such cases of orientation were found in two compounds of iron, but even these orientations were found to depend, at any rate in some cases, upon the direction in which the surface of the glass slide had been rubbed before cleaning for the experiment. The main result of this long, difficult, and expensive research has only been to prove that if there be any such effects as those looked for, they require, to show them *indisputably*, more powerful fields than those of the very powerful electro-magnets used by the writer.

A photograph of the orientation of Marignac's basic sulphate of ammonium and iron $3Fe_2O_3.5(NH_4)_2O.12SO_3.18H_2O$ is given with this paper.